

SCIENCE

FRIDAY, NOVEMBER 25, 1887.

NOTHING IS GAINED by maintaining profound secrecy and mysterious silence regarding the affairs of any institution that appeals to the general public for support and encouragement. This is especially true in the case of educational institutions; and, as a rule, those colleges which have frankly stated their financial condition and needs have been the first to be provided with the means of readjusting and supplying them. The more progressive of the alumni of Columbia College have for many years insisted that that college was out of touch with the community because of the unwillingness of the trustees to make known their plans and to ask for financial aid. There was unquestionably much force in this position; and it was not surprising, therefore, that when, three years ago, after a century of dignified reserve, an appeal was finally made for four million dollars to equip the university, no response was received. It is to the credit of the alumni that they persistently criticised the policy of the trustees, until now the point has been yielded by the latter. Hereafter the alumni and friends of the college will receive each year a digest of the annual reports of the president and treasurer on the state of the college. The first of these digests has just been issued, and a copy is before us. We need not refer to that portion of it which is taken from President Barnard's report, for that was commented on in *Science*, No. 244. The abstract of the treasurer's report, however, is new, and it presents many points of interest. It shows the total income last year to have been \$388,544.13, and the total expenditure \$365,582.25. The surplus was \$22,961.88. By far the major portion of the income (\$224,062.61) was derived from rents, the next largest item being students' fees (\$142,127.50). Of the amount expended, \$249,199.67 went for salaries of professors and instructors, and only \$8,744.25 was used to buy books with. The bonded debt of the college is shown to be \$330,240, and the available cash to meet it with will be, by June 30, 1888, \$239,317. It will therefore be seen, that while Columbia is heavily in debt at present, yet in two years at most the debt will be paid, and then a large annual surplus will be available for the much-needed extensions. It will be a glad day not only for Columbia, but for the cause of university education in this country, when its board of trustees has sufficient money to vote a generous sum for the purchase of books, to properly equip the graduate departments in philosophy and social science, — in which particularly the demand exceeds the supply, — and to make marked extensions of the scientific departments. We hope yet to hear that President Barnard has been able to work out these problems, and to crown his distinguished and successful administration by the creation of a university faculty of philosophy — in the German sense — which shall be absolutely distinct from the faculties of arts and mines, as at present organized. In this step lies the possibility for Columbia's becoming the metropolitan university.

BY THE SUDDEN DEATH of Rev. Edward Thring of Uppingham School, England, the cause of sound education is deprived of the services of one of its ablest and best advocates. Mr. Thring's name is as familiar on this side of the Atlantic as in Great Britain, and his 'Theory and Practice of Teaching' has had many readers in this country. Mr. Thring was born in 1821, and was just completing his sixty-sixth year when he died. For thirty-four years he has labored as a teacher, having been made head master of Uppingham School in 1853. When Mr. Thring went to Uppingham, he found a local grammar-school of an Elizabethan founda-

tion. He leaves it one of England's great public schools. Mr. Thring's cardinal principle was the necessity for giving every pupil individual care, and not treating a whole school as a mass. The faithful application of this principle was one cause of his great success as an educator. As a speaker and writer he was direct and inspiring, and his voice and pen will be greatly missed. Mr. Thring stood side by side with Mr. Quick and Mr. Fitch, as one of the three great public educators of England.

THE FORTHCOMING CROP REPORT from the Department of Agriculture will contain an interesting article from J. R. Dodge, the statistician of the department, on India in wheat-competition, that will go far toward dispelling the growing fear that competition from India would seriously affect the wheat-growers of the United States in the markets of Europe. Mr. Dodge points out the significant facts, that, while a large increase in the wheat-growing area of India is impossible, the annual home consumption of wheat is constantly increasing; and that, while it is true that with improved methods of agriculture the present acreage will become more productive, the increasing prosperity of the people will bring about a corresponding increase in wheat-consumption. Mr. Dodge thinks that much of the increase in the exportation of wheat from India which followed the opening-up of railroads into the interior was due to the shipping of the accumulated surplus that had been stored up for use in the famine years. The conclusion to be drawn from Mr. Dodge's article is, that the export for 1887, of about 42,000,000 bushels, is very near the maximum that may be expected from India.

ASPECTS OF EDUCATION.

The English Public School.

THE term 'public school' is difficult to define. In England it has a meaning different from what it has in America. The American public school is a school supported by the community, and open to all the world. When it is said that public schools are the backbone of the American system of education, it is implied that there exists all over America a number of schools affording a liberal education, either free or very inexpensive, accessible to all classes of the community alike. An English public school implies something exclusive and privileged. A public-school man is different from other men. The question as to whether a particular school is a public school or not, depends not upon its size or its efficiency, but upon its social rank. The American public schools are day schools: the English public school in the strict sense is essentially a boarding-school. Our public schools are few in number, confined to particular districts, costly, and very diverse in individual character; yet it is said that they represent more completely than any other English institution the chief peculiarities of our national life. It is the public school that forms the typical Englishman: it is the ordinary boy of the upper classes who gives his character to the public school. We have to inquire, first, what are the English public schools? second, how did they come to be what they are? third, what are their principal characteristics, and what relation do they bear to the educational system of England?

When the English Government undertook, some twenty-five years ago, to inquire into the condition of our secondary education, nine schools were singled out from the rest as pre-eminent. These were Winchester, Eton, Westminster, Charter House, Harrow, Rugby, Merchant Taylor's, St. Paul's, and Shrewsbury. Captain de Carteret Bisson, in his valuable work 'Our Schools and Colleges,' apparently disputes the right of the last three, and reckons our public schools at six. These six, between them, do not educate much more

than four thousand boys; and yet they are so typical of all schools which may have a claim to the title of public, that we may conveniently confine our consideration to them. Of these, Winchester dates from the fourteenth century; Eton from the fifteenth; Westminster, Harrow, and Rugby from the sixteenth, these three having all been founded within eleven years of each other; and Charter House from the seventeenth. Westminster, the oldest of the schools, has probably kept its character most unchanged. It has never been a fashionable or a court school. It has maintained unimpaired its close connection with New College at Oxford. Nothing can show more clearly the strength and unity of English traditions than the fact, that, five hundred years after the establishment of the two foundations of William of Wykeham, they should stand in the face of England, holding the highest place, one as a college, and the other as a school. Eton, the next on our list, is confessedly the first of public schools, but it was not always so. During the first eighty years of the seventeenth century, Westminster undoubtedly held the position of pre-eminence. Dr. Busby, who read the prayer for the King on the morning of Charles I.'s execution, and who refused to take off his cap in the presence of Charles II., was the first schoolmaster of his time in England. But Westminster was faithful to the Stuarts: Eton supported the cause of the Whigs. Its supremacy, beginning in the reign of William III., continued in that of Anne, reached its height under the Hanoverian kings. George III. took a strong personal interest in the school. Eton boys walked on the terrace of Windsor Castle in court dress, and the King often stopped to ask their names and to speak to them. William IV., with boisterous good humor, continued the favor of his dynasty. He took the part of the boys in their rebellion against the masters, and he used to invite the boys to entertainments, at which the masters stood by and got nothing. During this period Eton became a political power in England. The upper school at Eton is decorated with the busts of statesmen who swayed the destinies of England, and who were the more closely connected together from having been educated at the same school. Chatham, North, Fox, Grenville, and Gray are among the ornaments of that historical room. Eton and Christ Church had the monopoly of education for public life, and the claim of the school to this distinction received its fullest recognition when Lord Wellesley, after a career spent in the most important offices of the state, desired that he might be laid to his last rest in the bosom of that mother from whom he had learned every thing which had made him famous, successful, and a patriot. Better known, perhaps, is the boast of his brother, the Duke of Wellington, that the battle of Waterloo was won in the playing-fields of Eton.

Charter House, established in London, has held since its foundation a position very similar to that of Winchester, not of great importance in politics or fashion, but highly influential and respected. These four schools were probably founded for the purposes which they have since succeeded in carrying out. Eton was always a school for the governing classes. Winchester and Charter House have received the uninterrupted support of the gentry and clergy of England. The history of Harrow and Rugby has been different. They have been lifted by circumstances into a position for which they were not originally intended. They were founded as local schools,—one in the neighborhood of London, the other in the heart of the midlands,—for the instruction, first of the village lads, and then of such strangers as came to be taught. But they have reached, owing to special circumstances, a position equal to that of any of their rivals. Harrow emerged from obscurity in the middle of the eighteenth century, owing, as it is said, her success to head masters who were sent to her from Eton. Rugby is known throughout the world as the school of Arnold, who was head master from 1827 to 1841. Even before his time it had attained a high rank among English schools; but he, followed by a line of distinguished successors, left it in scholarship and energy of thought at their head. Rugby and Baliol are to English education after the reform bill, what Eton and Christ Church were before it. This sketch will show how different the genesis of our public schools has been, and what various courses they have pursued to arrive at the same conclusion.

We will now briefly trace the history of the education they aim at. Their curriculum is essentially classical: indeed, a public-

school man means, in common parlance, one who has been educated mainly in Greek and Latin. The two oldest schools, Winchester and Eton, founded before the Reformation, naturally began with monkish learning. There was a great deal of grammar and a great deal of church-going. The pupils were children, and were treated as such. Westminster was founded after, and in consequence of, the Reformation, and the breach with the old learning necessitated new arrangements.

The author of the Protestant curriculum of public education was John Sturm, the friend of Roger Ascham, the head master of the great school of Strasburg during a large portion of the sixteenth century. A complete account of Sturm's methods and organization is preserved, and we may be sure that its main outlines were adopted at Westminster and at Eton. Latin grammar and Latin style were made the principal subjects of education. The school was launched upon the full flood of humanism. The connection between a scholar in the narrow sense, that is, a man not of erudition but of finished taste and polished style, and the gentleman, was now fully established. Sturm was so despotic in the arrangements of his school, that he not only laid down what boys were to learn at each epoch of their career, but he forbade them to learn any thing else. It was as great a fault to begin a subject prematurely as to neglect it in its due time.

Many of Sturm's arrangements are familiar to public-school men who are now living, but in the following century they underwent a further change. This was due to the Jesuits, who obtained their reputation partly by their devotion to the study of Greek, and partly by the pains they took to understand the individual character of their pupils. The Jesuits have probably done more harm to sound education than any prominent body of men who ever undertook the task. They had two objects in view,—to gain the favor of the rich and powerful, and to prevent the human mind from thinking. Humanistic education skilfully employed was an admirable instrument to this end. It flattered the pride of parents, while it cheated the ambition of scholars. The pre-eminence given in education to original Latin verses is typical of the whole system of the Jesuits. No exercise could be more pretty and attractive, or bear more clearly the outward semblance of culture and learning, yet no employment could more effectually delude the mind by an unsubstantial phantom of serious thought. The sturdy humanism of Sturm became corrupted by the graceful frivolity of the Jesuits, and in this condition public-school education remained until the efforts of a few obscure reformers, the genius and energy of Arnold and the growth of the new spirit in England, forced it into other channels.

Arnold is typical of the new public school, but we must distinguish between Arnold and the Arnoldian legend. Like other great reformers, his name has become a nucleus round which the reputations of all other reformers, good as well as bad, have coalesced. The most prominent fact about Arnold is, that he was the first Englishman of quite first-rate ability who devoted himself to school-education. The traditions of Sturm and the Jesuits shrivelled up before the manly touch of a teacher who was fit to be prime minister. After his career no one could despise the profession of a schoolmaster. What did Arnold actually effect? He taught boys to govern themselves. He substituted for a system in which the governors were allowed any license on condition that they denied it to every one else, one in which the responsibility of the ruler was rated even more highly than the obligation of the ruled. He also taught boys to think for themselves, to pierce beyond the veil of words into the substance of things, to see realities, to touch and taste and handle the matter of which they had before only talked. Thus he produced a vigorous character and a manly mind. Rugby boys, on passing to the university, thought and acted for themselves. They might be pardoned if in the first flush of enthusiasm they acted priggishly and thought wildly. But Arnold's teaching contained within it germs of much which he had never contemplated, and of which he would have disapproved. It contained the germs of the modern civilized life in schools, of which Rugby knew nothing in 1840. Far, indeed, is the cry from that dim and crowded dining-room where boys, sitting at a bare table, wiped their knives on the iron band which surrounded it, and ate their meat and pudding off the same plate, to the luxurious arrangements of a modern pre-

paratory school. It contained the germ of modern-side education. Arnold did not know that he was passing from Melancthon to Comenius, and that the study of things once set rolling would soon displace the study of words. It contained the germs of a new confidence and friendship between boy and master quite as different from the sly sentimentality of the Jesuits as it was from the pompous neglect of the old-fashioned courtly don. It contained, alas! in germ the subjection of the master to the boy in standard, tastes, and habits, which threatens to be the ruin of our public schools. It crystallized also the idea, which otherwise might have disappeared, that a head master must be of necessity a clergyman, and that no school could be properly conducted unless its chief sums up in the pulpit every Sunday afternoon what are supposed to be the spiritual results of the week's emotions. It stamped also with permanence, by a natural misunderstanding, that conviction of a head master's autocracy which prevents the formation in England of a profession of education. The history of English public schools since Arnold is merely the carrying-out under varying circumstances of the teaching of his example, and the development, sometimes to disastrous ends, of abuses to which that example may seem to lend currency.

A few words only are needed in conclusion as to the present and future of our public boarding-schools. Nothing has altered their character more than their growth in numbers, which has been the result of popularity. In Arnold's time no public school except Eton exceeded three hundred boys. Arnold and his contemporary head masters might boast with truth that they knew every boy in their school by sight, his habits, his capacity, his friends. A school thus governed by one man, and penetrated by his influence, differed not only in degree, but in kind, from a school which has of necessity become a confederation. In a public school of Arnold's date games were still amusements. Formerly neglected and ignored by pedagogues, they became the nurse of every manly virtue when a more sympathetic eye was turned upon them. Tom Brown's school-days represents the heroism of the forties,—the high-water mark where boyish enterprise and independence reached their height under the influence of manly recognition. During the last quarter of a century, games have become a serious business, instead of the wholesome distraction of public-school life. They are organized as elaborately as the work. Masters are appointed to teach them like any other branch of study: they form the basis of admiration and imitation between boy and boy, and the foundation of respect and obedience between boy and master. It is difficult to keep large numbers of boys, with only five years difference in their ages, quiet and wholesome without a large development of games. They have been admitted to their full share in the school curriculum. A public boarding-school is no longer a place where, amidst much liberty and idleness, there reigns a high respect for character and intellect, and where the ablest boys are left ample room to fashion each other and themselves. It is a place where the whole life is tabulated and arranged, where leisure, meditation, and individual study are discouraged, and where boys are driven in a ceaseless round from school to play-room, from play-room to school, regarding each as of equal importance, and bringing into the most delicate operations of intellectual growth the spirit of coarse competition which dominates in athletics.

It is difficult to say what changes public boarding-schools are destined to undergo, or whether in an age in which education is so much extended a system so expensive and so exclusive can continue to flourish. The last few years have witnessed the growth of large public day-schools, and any development of national education would be certain to increase their number. Although the Arnoldian system is little applicable to them on its best side, yet they are of necessity free from most of the abuses to which that system has given rise. An idea may grow up that the home is, after all, the best place for children, and that children are the best safeguard of a pure and happy home. Should English society in its new development prefer a kind of education which is the normal type of all countries but our own, which improved communication makes it easier to adopt, we shall still have public schools of which we should be proud: they will continue to represent our best national qualities, but they will be very different from the public boarding-schools of the past.

OSCAR BROWNING.

THE NÄÄS SEMINARY FOR TEACHERS OF MANUAL TRAINING.¹

IF any inquiring friend of manual training endeavors to find Nääs on any ordinary map of Sweden, he will be disappointed. It is an old Swedish country-seat, beautifully situated on the pretty lake Sävälängen, about ten hours' journey from Gothenburg. The railway from Gothenburg to Stockholm passes in the vicinity, and the intending visitor to Nääs leaves the train at Floda station. From Floda to Nääs is a short journey by boat or on foot. The two settlements are not more than an hour's walk apart.

Nääs itself is situated on the highest point of a narrow strip of land. The lake here is about thirty metres broad, and is spanned by a substantial stone bridge. The castle is attractive, but represents no particular style of architecture. On both sides of the lake are beautiful woods in which the birch and the alder predominate. The situation is as lovely as nature and art can make it.

Herr August Abrahamson bought this place about fifteen years ago. He began at once to set aside a certain portion of his great wealth, acquired as a merchant in Gothenburg, to aid the population of his own neighborhood, and to improve their condition. He began by rebuilding many of the peasants' poor houses, and by teaching them something of systematic agriculture. Afterwards he built three schools in which instruction is given free, and for their support he donated the handsome sum of 225,000 crowns, or over \$50,000.

In the year 1872, Herr Abrahamson opened a school for boys from ten to fourteen years of age.² The curriculum of this school contains twenty-two hours weekly of instruction in religion, language, history, geography, natural science, writing, arithmetic, singing, and gymnastic and military exercises,³ and twelve hours weekly of instruction in manual training. The manual training has in this, as in almost all the other schools of Sweden (those of Gothenburg alone are an exception), no other aim than to prepare the boys for any trade whatsoever. The aim is thus a purely pedagogic one. Manual training is treated as a means of education, and is placed side by side with the other school-studies. By means of the methodical instruction in the use of tools and in the construction of one hundred objects, carefully arranged and graded, the pupil acquires a general manual ability which is of great advantage to him, no matter what calling he afterwards follows. Besides this, the manual training furnishes a healthy physical exercise, and, with the gymnastic instruction, affords an excellent means of escape from over-brainwork. It is also found that manual training gives the pupils a love for work and an enjoyment in it, and develops in a thorough manner their independence, attention, industry, and perseverance.

In the year 1874, Herr Abrahamson established a similar school for girls between ten and fourteen years of age; and the aim of this school was not only to instruct the girls in the usual subjects of a school course, but to make them adepts in the domestic arts. In the plan of studies, twenty-one hours a week are devoted to the usual studies, and fifteen hours a week to manual instruction.

Herr Abrahamson was, however, determined to extend his philanthropy as widely as possible, and to work for the cause of education, not in his neighborhood alone, nor in Sweden only, but in general. Thoroughly imbued with the idea of working out an harmonious scheme of instruction for children, to the completion of which the greatest educators have urged as necessary a graded course of instruction in manual work, Herr Abrahamson founded in June, 1875, the Seminary for the Instruction of Teachers in Slöjd (manual training); and this institution has since acquired a wide and well-deserved reputation.

During the first five years of its existence, the seminary course had in view the preparation of special teachers for the courses in manual training. The course lasted one year. To enter the seminary, a candidate must be at least eighteen years of age, in good health, and with such preparation in school-subjects and physical

¹ From S. Rudin's Bericht über eine Studienreise.

² The Swedish public schools are of two distinct grades,—the elementary school, for children of from six to ten years of age; and the common school proper, for children of from ten to fourteen years.

³ The Swedish boys receive in the public school their military instruction, and are exercised in the handling of weapons, as are cadets in other countries.

exercises as was necessary to pass the examination for graduation from the Swedish common school. The instruction given in the seminary was partly theoretical, and partly practical. The theoretical instruction occupied eighteen hours weekly, and included arithmetic, geometry, physics, mechanics, mechanical drawing, and pedagogics. The practical instruction occupied eighteen hours a week, and was intended to teach the use of the various implements of the joiner, the turner, the modeller, and the smith, to impart familiarity in the use of these tools, and to enable the pupils to make the furniture and implements that are found in every household. For practice, the students gave instruction, under the supervision of a trained teacher, in the schools for boys and girls above mentioned. On graduating, the student had to pass an examination in the theoretical subjects, and demonstrate his practical ability and his fitness to teach. On meeting these requirements satisfactorily, a diploma was awarded.

In 1880 this plan of instruction was essentially altered. The scientific subjects were dropped, and the entire time devoted to instruction in manual training. The length of the course was reduced to six weeks, and the training was arranged to meet the needs of certificated teachers who wished to fit themselves in these other subjects. Several, usually four or six, of these six-weeks' courses are given each year, and so popular have they become that many applicants have to be turned away. An account of one of these courses is interesting. That given in 1885 from July 8 to Aug. 18 was attended by 42 students, of whom 28 were Swedes, 3 Norwegians, 1 a Dane, 1 a German, 1 a Swiss, and 8 were female teachers from Sweden, Norway, and Finland. Six hours daily were spent in the workshop, under the supervision of Herr Salomon. The same gentleman, who is the director of the seminary, lectured seven hours each week on the historical development and the methods of manual training, and also presided twice weekly at assemblies of the students, held for the purpose of discussing the Nääs system in general and in its details. The results of these discussions were registered in a book kept for the purpose, and they accomplished diverse improvements in the details of the course.

Throughout the course a religious service was held daily, which was opened and closed with prayer and sacred song. No one was compelled, however, to attend this service.

The programme of instruction included a daily lecture from seven to eight o'clock in the morning, slöjd exercise from 9.30 to 1.30 and from 2 to 6 P.M., excepting Saturdays, when the slöjd ended at noon, and the remainder of the day was devoted to school-work and trial lessons. Two evenings weekly were given over to the discussions, and two more to lectures by Director Salomon. Herr Abrahamson was often seen in the work-rooms, and for every student he had a cheering word or a suggestion, and his personal influence was strongly felt among them.

In his lectures, Director Salomon developed the ends which manual training is to subserve, with great ability and perspicuity. He distinguished these ends as formal and material. The formal ends, he showed, were, (1) to arouse a desire for work and a pleasure in it; (2) to accustom pupils to independence, and to fit them for it; (3) to instil the virtues of exactness, order, and accuracy; (4) to train the attention; and (5) to train pupils in habits of industry and perseverance.

The material ends of manual training, Herr Salomon explained to be as follows: (1) to win the interest of the children, and therefore (2) to give them something useful to work at; (3) to require and promote orderliness and exactness; (4) to develop cleanliness and neatness; (5) to provide an opportunity to exercise and develop the sense of form; (6) to appeal to both the mental and physical powers of the child; (7) to strengthen the muscles; (8) to afford a relief from long-continued sitting at school; (9) to train the pupil to methodical and accurate expression; and (10) to promote a general ability to do hand-work. NICHOLAS MURRAY BUTLER.

A PLEA FOR THE STUDY OF LOGIC.

MOST intelligent persons are very lavish in their expressions of admiration for the many important aids to the science of education, and consequently to the armamentarium of the teacher, which have been developed during the last fifty years. And yet, notwithstand-

ing our progress in the methods and appliances which aid the teacher so much, many of our best educators are not satisfied with much of the work at present accomplished, and remedies are suggested from various quarters. It seems to me that most persons fail to appreciate the direct cause of the trouble, and in consequence their proposals are not such as will cure the ills of our great school system.

The object of an education should be to so train the faculties which nature has given the student, and to impart to him such knowledge, that he will be the better prepared to fill that particular station in life for which he seems destined, and which will enable him to grow in knowledge with his years, if he will continue the same methods of study after his graduation.

The school and college course should be regarded only as a beginning; and by reason of this education, if it has been as successful as we have a right to expect, the further acquisition of knowledge will be much easier. It is a source of great satisfaction to perceive that the old idea of a higher education, which consisted in turning out a polished man or woman upon society, who was almost wholly ignorant of the laws of nature, and especially so in all that pertained to their own organization, is no longer defended in the institutions of learning in this country. It is so at least in those worthy of any consideration as educational centres, and yet much remains to be accomplished under the new régime.

One of the desirable objects at present is to educate a man so that he may be able to overlook intelligently the whole field of knowledge, and to know how and where to obtain what he needs. The departments of human learning are already so numerous, that a general education can give but an insight and acquaintance with the many; while, if excellence in any one is desired, one must become a specialist.

Up to the present time, our greatest achievements in knowledge have been effected by our adherence to a certain form of reasoning known as the 'scientific method,' which combines the inductive and deductive processes. Until the full recognition and definition of this combination, progress was painfully slow, and was often retarded by the timely discovery that what had previously been regarded as truth, was, by reason of the imperfect methods made use of, only partly true, or altogether false. Certainly we had a right to expect that when the new method had been worked out, and had achieved grand results, every educator would be enthusiastic in its praise, and never cease to urge its study upon those who are seeking the knowledge in possession of the race at the present time, and especially upon those who hope that they themselves may be able to make some additions to the common fund of knowledge. But instead of this, it seems to have been forgotten, at least as any thing of importance with which young students should become acquainted; and when it is taught, it is reserved until they have nearly completed their school-education.

The very principles that would be of incalculable advantage to the student, if inculcated early, are reserved until he has, perhaps, formed vicious habits of statement and reasoning, and which are not then so easily described. Perhaps the greatest defect of our educational system at present is the almost universal manner in which logic as a study has been ignored by our educators.

It may be urged that the logical principles are contained in some of the other branches taught; and as, in this way, knowledge is gradually increased, the pupil naturally appreciates the laws of reasoning involved in these studies, and therefore does not need the separate study of logic. But I do not believe this ground is well taken; for, although it is true that we are all to some extent logicians, too many are very imperfect ones, and they are unfortunately in the majority.

When a boy is placed at a trade involving the use of tools, the first step usually taken is to acquaint him with their construction, use, and care. But such delicate and intricate instruments as those which make up the human mind, seem to call for no special knowledge or training as to their use or care. Would it not be fully as wise to teach the younger scholars in the beginning of their education, soon after learning to read cleverly, — say, between the age of ten and twelve, — the fundamental principles of correct reasoning? The study of logic would be likely to cultivate the faculty of observation, which is so necessary in a true education.

Professor Farlow of Cambridge gave utterance, in the *Popular Science Monthly* about a year ago, to these sentiments in the following language: "I have said enough to show that unless my experience is an exceptional one, in spite of all the talk on the subject, boys at school are not taught to observe as they should be, and that even those teachers who use good text-books, frequently use them as means of imparting facts easily and quickly by the old method, rather than as an aid in the scientific training of the faculties which must form the basis of any serious study of biology." And again he says, "It seems a great pity that students should come to college so ill fitted, as are the majority, to undertake biological work. But we must accept things as they are; and there is no use in attempting to take the second step before the first has been taken. If the school can not or will not teach observation, then it must be taught in college, no matter if it does seem to be child's work. In colleges, however, it is absolutely impossible to find the time or the means for training every one to become an observer, and we are obliged to distinguish between two different classes of persons in arranging courses in biology."

These are the words of a professor in one of our best universities, as to the condition of the students sent there from the best schools in our land. In his sphere as an educator he has discovered this logical deficiency in the students who are anxious for a higher education. In a different sphere of life, no part of which has been spent in teaching, I have observed this great deficiency among the people who have received their education in our public schools, as well as in some of our colleges. There must be a cause for such a general condition as that referred to, and the one to which I attribute it may not be the only one, or a correct one. Be that as it may, it will perhaps occasion no surprise when the position is taken that the most important factor tending to perpetuate this imperfect development of our perceptive faculties is that logical methods have not been taught in our schools.

I believe nothing of greater importance can be taught children in the earlier periods of their education than this; but it should not be attempted by simply placing text-books in their hands. The teachers should first be familiar with the elementary principles of logic themselves, and spend a portion of each day, or several days each week, in an endeavor to teach the pupils the art of observation, together with the proper use of words, and how to draw correct conclusions from an observation. It is of vast importance that words should be correctly used in the formation of terms and propositions; and the study of reading and grammar alone is not likely to secure this.

If you do not teach children these principles of logic in early life, when they grow up, they are too prone to accept all that has been taught them as true, because the source from whence they received it was so eminently respectable. Thus they will lose or suppress their critical impulses, which are so necessary to mental growth: they will, in fact, be smothered by authority, and the result will be just what Professor Farlow has described as the deficiencies of his students.

Logic will continually incite the pupil to question things; and to do that, they must be observed and their characters noted, whether they be objects in the animal world about them, or some arrangement of words by which an endeavor is made to express a definite idea. The assertion made by some, that we are naturally logical, only tends to confirm the importance of these principles in any system of education. We can hardly have too many persons in this world who understand logical methods of reasoning, no matter how many there may be to whom reasoning according to these principles comes without education.

We know too well that most persons use exclusively the *post hoc, ergo propter hoc* method of reasoning; and they make up the impressionable portion of humanity. The views generally entertained about the nature of evidence are also exceedingly varied and fanciful. One has only to listen to a group of men of ordinary education and a fair endowment of common sense, discussing any subject of interest, to become convinced that this defect of early education is a glaring fact.

Even among laborers and mechanics, we can see the disastrous effect of this deficiency in early training. Could they have had these principles drilled into them by teachers who really under-

stood and practised them, they would be more inquisitive in their work, in order to see whether it was the best that could be effected for the end in view.

It is useless to cite examples, for they are familiar to all. Much has very justly been said, in derision of the differences of opinion among professional men, upon topics which should not, from their nature, give rise to such varied conclusions; and especially has this been enlarged upon in its application to the medical profession. "Is there any sufficient reason for such a state of things?" has often been asked. This is probably not to be attributed to one cause alone, where so many different individuals have to be taken into account, although I believe it is to be explained in large part by their deficiencies in the science of logic; otherwise the uniformity of their conclusions based upon the same facts would be greater.

The records of medical literature are filled with rubbish, that no man, with any knowledge of the elementary principles of logic, would think for a moment worthy of preservation. A medical man has, for example, a peculiar and protracted case of disease: he employs a number of different remedies, and after weeks, or perhaps months, the patient recovers. The delighted physician at once rushes into print with an account of the wonderful virtues of the remedy last administered to his patient, and no suggestion as to the insufficiency of the evidence adduced in order to establish a new truth seems to intrude itself upon his consciousness. And it is in this way, and for this reason more than any other, it seems to me, that medicine continues to deserve the designation of an art rather than that of a science.

But it may be asked, is there no danger that the uniformity that might result from such a general study of logic would become so great as to hinder the development of new ideas and methods? I think not. For although the methods of logic to which we owe our greatest triumphs—and consisting of the four following steps: (1) preliminary observation, (2) construction of hypotheses, (3) deductive reasoning, (4) the process of verification—are the nearest possible approach to perfection in reasoning, and may not be at present susceptible of improvement, it would not prevent some genius from unfolding a new and better system, should such be within the bounds of possibility. I think we need have no fear, even though we were all accomplished logicians, that there would be too much uniformity in our conclusions.

Thinking is no doubt the most important function or attribute of man; and, as the brain will continue to think, let us do what we can to encourage its very best performance.

In an examination of such reports as I could obtain from the Bureau of Education at Washington, with the view of ascertaining whether any of our schools were teaching logic, I was unable to find it in the curriculum of any State, though it is true that only a few were given. The sole reference to it in connection with the schools of the United States was in a list of books considered suitable for teachers' libraries, and prepared by the librarian of the Bureau of Education, which recommended Professor Jevons's 'Elementary Lessons in Logic,' and a work by John Stuart Mill.

In a programme of the studies in a mixed school in a certain department in France, I found the upper class, from eleven to thirteen years of age, devoting thirty-five minutes in the afternoon to a recitation of which logical analysis was a part; and this is the only reference to it as an object of study I have been able to find.

Professor Agassiz, in speaking of the study of natural history being of great value to all scholars in urging its importance, goes on to say, "The difficult art of thinking can be acquired by this method in a more rapid way than any other. When we study logic or mental philosophy in text-books which we commit to memory, it is not the mind we cultivate, it is the memory alone. The mind may come in, but if it does in that method, it is only in an accessory way. But if we learn to think by unfolding thoughts ourselves from the examination of objects brought before us, then we acquire them for ourselves, and we acquire the ability of applying our thoughts in life. *It is only by the ability of observing for ourselves that we can free ourselves from the burden of authority.* So long as we have not learned how to settle a question for ourselves, we go for authority, or we take the opinion of our neighbor; that is, we remain tools in his hands, if he choose to use us in that

way, or we declare our inability of having an opinion of our own. How shall we form opinions of our own otherwise than by examining the facts in the case? and how can we learn these facts which are unchangeable, those facts over which man, with all his pride, can have no control?"

I have no hesitation in thus quoting Professor Agassiz, although he seems to be against me, judging from his reference to logic alone, because his remarks seem so applicable to what I am urging, in that they so strongly inculcate the necessity for logical training (and which the study of natural science gives) in what is certainly a convincing manner. Still, I am fully persuaded that he would not have spoken in this way about logic, if it had been understood that it was to be taught in the way he urged with natural history; viz., to take the objects or words and propositions in use every day, and apply these principles to them. It then becomes something very much higher than a mere feat of memory, and I fail to see why instruction in logic would be any waste of time, even when natural history was being studied, and where the kind of work to which Professor Agassiz refers is out of the question; and for the present this seems to be the case in all our grammar-schools. The great desideratum is the proper presentation and teaching of logic by those who really understand it themselves.

In conclusion I would say that it is very difficult for me to understand why, if logic is ever worthy of study, it is not more necessary in the beginning of an education than at its close. I will therefore hope that all who are engaged in the profession of teaching will give this subject their serious consideration, and perhaps trial. Let us not forget that logic teaches us to reason correctly; that good reasoning will give us more knowledge, and this will give us power; which, if combined with good character, cannot help making its possessor more valuable to himself and to his fellows.

S. J. BUMSTEAD.

THE AMERICAN PUBLIC HEALTH ASSOCIATION.

The American Public Health Association held its fifteenth annual meeting at Memphis, Tenn., on Nov. 8, 9, 10, and 11. The attendance was good, among those present being many of the prominent sanitarians of the United States and Canada. At the first session ninety-four new members were elected. The annual address was delivered by the president, Dr. George M. Sternberg, U.S.A. The following is an abstract of the address:—

"It was due to the yellow-fever epidemic of 1878, in which Memphis was the chief sufferer, that steps were taken at our meeting of that year, in the city of Richmond, to urge upon Congress the importance of a national board of health. Recognizing the fact that epidemics do not respect State boundary-lines, and that an efficient sanitary service in times of emergency requires a liberal expenditure of money, and unity of action on the part of sanitary officials, we urged the formation of a central health board, and for a time it seemed as if our well-meant plans would be crowned with success. Indeed, they were crowned with partial success, for all must recognize that in the early days of its existence the National Board of Health accomplished much good. It is unnecessary for me to refer to the various circumstances which conspired to paralyze the effective energy of this board. Unhappily it is a thing of the past, and the hopes which we had founded upon this our bantling are but a memory of the past. But we should not be discouraged that our first effort has failed. A careful consideration of the circumstances which led to this failure may enable us to mature a better plan. Such a plan, indorsed by the judgment of the experienced sanitarians here assembled, and properly presented to our national legislators, could not fail to receive respectful attention.

"One thing appears to me to be thoroughly demonstrated by the experience of the past; namely, that a central health board, to be efficient, must be attached to one of the departments of the government now in existence, so that it may be under the protection of a cabinet officer. It would be useless to ask at the present time that the sanitary interests of the country may be represented by an additional cabinet officer, a minister of public health, although there can be no doubt that the interests involved are sufficiently important to justify such an innovation. But we may at least demand that the sanitary interests of the people of the United States shall receive the same consideration from the national government that is

accorded to the educational interests, the agricultural interests, etc. We may at least ask for a bureau of public health, with a commissioner at its head, and with the necessary secretaries and clerical force to make it efficient; and attached to such a bureau should be a well-equipped laboratory, in which expert bacteriologists, chemists, and sanitary engineers should be employed in the experimental investigation of unsettled sanitary problems, such as the natural history of disease-germs, the best methods of destroying them, protective inoculations against infectious diseases, problems in sanitary engineering (such as the disposal of sewage, domestic sanitation, etc.), food-adulterations, and a variety of other questions of equal importance, which will readily occur to you. I do not approve of the plan of having a central board of health, composed of members located in various parts of the country. Such an organization is cumbersome, and it cannot be expected that a board which is only assembled at long intervals, and of which the members are occupied by various pursuits, which claim their time and best thought, will render the most efficient service. On the other hand, by diversity of opinions they may greatly embarrass their executive officer, who must necessarily be located in Washington. Nor, in my opinion, would a board composed of officials at the head of various departments in Washington, such as the surgeon-general of the army, the navy, and the marine-hospital service, as has been suggested, be much better. These officials are fully occupied with the duties pertaining to their office, or at least have not sufficient leisure to undertake the executive work of a central health bureau. I would therefore expect better results from the untrammelled action of a single commissioner, who would be responsible directly to the cabinet officer to whose department his bureau was attached, and who would necessarily be controlled by the law defining the nature of his duties. In this case it is evident that the good accomplished would depend largely upon the fitness of the man selected for the special duties intrusted to him, and that a political appointment in the first instance, or the removal of a suitable man for political reasons, would entirely defeat our object.

"We may, however, ignore this possibility, and trust to the good judgment of the chief executive and the growing public sentiment in favor of retaining efficient bureau officers, without regard to party changes.

"In connection with a bureau of public health, it would certainly be desirable to have an advisory board of health, to which the commissioner could refer questions for consideration, or which could advise him of new measures, or desirable changes in his regulations, which, after full discussion, commended themselves to the judgment of the board. Such a board should have no executive power, and the members should receive no pay beyond their actual expenses in attending the appointed meetings. I would suggest that such a board should consist of the surgeons-general of the army, the navy, and the marine-hospital service, and of the presidents of State boards of health. One annual meeting in Washington would probably answer the purpose for which a board would be constituted, except in case of an actual or threatened epidemic, when it might be convened, at the suggestion of its president or of the commissioner of health.

"I request your careful consideration of the plan here suggested, and, if it meets your approval, would urge the importance of taking such action at the present meeting as will insure its being properly brought before the Congress of the United States."

Dr. Sternberg referred to the epidemic of yellow-fever at Memphis in 1878, and the sanitary improvements made in the city since that time, and then gave its inhabitants the following advice:—

"Do not allow yourselves to fall into a state of inaction and false security because for several years our foe has been kept at bay. Although it is now evident that yellow-fever is not epidemic in any portion of our land, and we have learned by recent experience that by proper measures it is possible to exclude it for a series of years, even from the city of New Orleans, yet there are so many possibilities of its introduction, in spite of the vigilance of those who have charge of the gateway of the Mississippi valley, that it would be folly to neglect those local measures of sanitation which remove the vulnerability of cities in the presence of the germs of pestilential diseases. Shutting the door is of prime importance, and while the keys are in the hands of our energetic and able colleague, Dr. Holt,

we may feel comparatively safe. But the efficient president of the Louisiana State Board of Health cannot guarantee that all avenues of approach are securely guarded, inasmuch as some of these avenues are quite beyond his control. This is exemplified by the Biloxi epidemic of 1886. Local outbreaks, such as that at Biloxi, and the epidemic at Key West and at Tampa during the present year, show that the conditions upon our Gulf coast are no less favorable to the presence of yellow-fever than they were in former years, and that our immunity depends solely upon the exclusion of an exotic germ. Unfortunately, also, the Biloxi epidemic illustrates the very greatest liability of physicians to fall into error with reference to the diagnosis, when yellow-fever unexpectedly makes its appearance outside of its habitual range. History repeats itself in this particular. The early cases in an epidemic, which are often mild, are pronounced to be malarial-fever; and this diagnosis is often sustained by those who have committed themselves to it, when no reasonable doubt remains in the minds of unprejudiced physicians as to the true nature of the malady.

"The question whether it is practicable to make a city, which lies in the area subject to invasion, proof against epidemics of yellow-fever and cholera, is one of very great importance. At the International Sanitary Conference at Rome the delegates from England and from India opposed all quarantine restrictions as unnecessary, and pointed to the fact that for years there has been constant and free communication between cholera-infested ports in India and the seaport cities of England, but that cholera has not effected a lodgement in that country. Dr. Thorne Thorne, of the local government board, a delegate to the conference, ascribed this immunity to the sanitary improvements which have been carried out in England during the past ten or twelve years. He stated, that, during the period included between the years 1875 and 1884, an amount exceeding six and one-quarter millions sterling per annum had been expended in England 'under private and public acts' mainly of a sanitary character." Dr. Thorne Thorne, in his report of the proceedings of the conference referred to, says, —

"Lastly, I would note that I took occasion to explain to the technical commission that expenditures such as I have referred to are, with only very trivial exceptions, voluntarily incurred in the interests of public health.

"I then went on to show, in connection with this expenditure, that the average annual mortality for England and Wales was now only 19 as opposed to 22 per 1,000 in the decennial period 1861-70, and this notwithstanding increase in population of some 5,000,000; and taking the continued fever mortality of this country as that which, in point of causation, most nearly resembled cholera, I pointed out, that whereas, in the five years 1865-69, this mortality was at the rate of 934 per 1,000,000 living, it had steadily fallen to 428 per 1,000,000 during the period 1880-82, and that it is now only 307 per 1,000,000."

"In a later communication, published in the *Practitioner* for October, 1887, Dr. Thorne Thorne gives fuller details of the English system of protection against cholera as follows: 'Having deliberately abandoned the system of quarantine, we began many years ago to organize the system of medical inspection with isolation. The medical inspection comes first into operation on our coasts. The customs officers board the vessel coming into our port, and they at once communicate to the sanitary authority the occurrence of any case of cholera, choleraic diarrhoea, or suspected cholera. A vessel so affected is detained until the medical officer of health has examined every member of the crew and passengers. Those actually sick of cholera or choleraic diarrhoea are at once removed to the port sanitary hospital, and any person certified to be suffering from any illness which that officer suspects may prove to be the cholera is detained for a true period of observation not exceeding two days. The medical inspection is thus followed by isolation of the sick. Unlike a quarantine system, this process does not interfere with the healthy, or expose them to risk by herding them together with the sick; but the names of the healthy, and the places of their destination, are taken down, and the medical officers of health of the districts in question are informed of the impending arrivals. This part of our system has been named our first line of defence, but it would be of little value if we stopped there. Our main trust is in the promotion of such local sanitary administration

in every part of the country as shall rid us of the conditions under which alone cholera can spread. In periods of emergency, as during the past three years, a special medical survey of such districts as are most exposed to risk is organized under the supervision of the medical officer of the local government board, and, where needed, the sanitary authorities are urged to action. Important as have been the results of the recent survey, they would go for little were it not for the steadily maintained work of the sanitary authorities and their officers throughout the kingdom; and we who have been taunted abroad for opposing quarantine, because its restrictions touched our commercial interests and pockets, may justly feel proud that in England and Wales alone the people have, during the past ten years, of their own accord, and apart from government dictation, spent, by way of loan or in current expenditures, over £80,000,000 sterling for purposes mainly of a sanitary character. And we may fairly ask whether any corresponding expenditure has in other countries given evidence of real faith in a quarantine system.'

"Without denying the value of the sanitary improvements which have been carried out in England, and the possibility that her immunity from cholera is largely due to them, the delegates from more exposed countries, such as France and Italy, demanded a quarantine station upon the Suez Canal, and pointed out the fact that their seaport cities were not in such a sanitary condition that they could hope to escape the ravages of the pestilence, in case of its introduction, and that to place them in such a state of defence would require time and the expenditure of large sums of money. It was noticeable that those countries (such as Turkey, Egypt, and Spain) where sanitary improvements have made the least progress were the most exacting with reference to quarantine restrictions. They evidently looked upon these as their only hope, and were advocates of the old-fashioned time-quarantine, which, as carried out in these countries, has often been attended with barbarities which are intolerable for civilized nations. Self-preservation is, indeed, the first law of nature; but it is barbarous to sacrifice the life of another to save our own, and, in guarding the lives of a community, we are bound to show due consideration for the health and comfort of those who are believed to be the possible bearers of disease-germs.

"Recognizing this humane principle, a majority of the delegates to the sanitary conference of Rome were anxious to effect a compromise between the old-fashioned time-quarantine and the British practice, which they could not rely upon for the countries of southern Europe. It was believed that such a compromise was practicable, and that the plan agreed to by a majority of the delegates present was more reliable than a simple quarantine of detention. I must refer you to the published transactions for the details of this plan; but in brief it consisted of a sanitary supervision of ships at the port of departure, when this was an infected port or in communication with an infected locality; in the sanitary supervision of ship and passengers while in transit, by a properly qualified physician upon all passenger-ships; and in such detention at the port of arrival as might be necessary for the disinfection of the ship, the personal effects of the passengers, etc. If one or more cases of cholera should appear on board during the voyage, they were to be isolated, and rigid measures of disinfection carried out, and the action of the health authorities at the port of arrival was to depend upon how effectively this had been done. In short, the treatment of the vessel and its passengers was not to be determined in advance by arbitrary rules, but was to be governed by an intelligent consideration, by an expert, of all the circumstances relating to the sanitary history of the ship from the date of its departure from the infected port. This rational quarantine service, which is far less burdensome to the commerce of a country than the arbitrary time-quarantine of former days, has proved itself to be also more effectual in accomplishing the end in view. This is amply proved by recent experience in our own country, where, to a large extent, the principles indicated control the action of the health-officers of our principal seaports. Look at the city of New Orleans, where epidemics of yellow-fever were formerly so frequent as to lead to the belief that the disease was endemic, and a necessary evil appertaining to the situation of the Crescent City. Happily, under an efficient quarantine service, she has now a record of seven years' exemption from the dreaded pestilence."

In discussing cholera and its probable appearance in the United States, Dr. Sternberg said, —

"It is perhaps too soon to speak with confidence with reference to the action taken by the sanitary officials of the port of New York upon the recent arrival of two cholera-infected vessels from the Mediterranean; but we have good reason to hope that the measures taken will prove sufficient, and that this pestilential disease, which has for several years been threatening us from a distance, has not effected a lodgement upon our shores. Whether it would be practicable to put our seaports in such a state of sanitary defence that it would be safe to open the door and defy the foe, is extremely doubtful. I have never believed that yellow-fever was excluded from New Orleans in 1862 and 1863 by the sanitary regulations enforced by General Butler, as has been claimed. The exemption from this disease enjoyed by the unacclimated soldiers from the North, who filled the hospitals in that city at the time mentioned, was due, in my opinion, to the absence of commerce during the military occupation of the city, and to the rigid enforcement of quarantine restrictions.

"But I do believe that this and other cities similarly located can be preserved from such devastating epidemics as have too often occurred in the past, and that, by the carrying-out of needed sanitary improvements and the constant supervision of expert sanitary officials, supported by an enlightened public sentiment and sufficient appropriations, the ravages of pestilential diseases may be restricted within very narrow limits.

"As regards cholera, the system of local defence is even simpler than in the case of yellow-fever. Ample evidence demonstrates that the epidemic extension of this disease depends largely, if not exclusively, upon the water-supply. Where this is subject to contamination by the discharges of the sick, there cholera is liable to become epidemic. On the other hand, cities like Rome, in Italy, which have an ample supply of pure water, drawn from a source not likely to be contaminated, seem to be cholera-proof, notwithstanding the filth and squalor in which a considerable portion of the population live. The same thing is seen in Naples, which in 1884 suffered terribly, but which, since the completion of its new system of water-works in 1885, has enjoyed a comparative immunity, notwithstanding the fact that cholera still prevails in Italy, and that we have evidence of its presence in a malignant form in the city referred to. When I was in Naples, in 1885, the mayor of the city invited a number of the delegates to the sanitary conference to the municipal palace for the purpose of conferring with them with reference to projected sanitary improvements, and especially with reference to the best system of sewerage for the city, which, up to the present time, remains destitute of sewers, and which, I may add, is a noted stronghold of typhoid-fever. In the course of the conversation, I suggested to the mayor Colonel Waring's American system, which has been tested with such favorable results in this city. My recommendation was sustained by the distinguished German bacteriologist, Dr. Robert Koch, who was one of the delegates present. I may remark that I have recently received a letter from Dr. Koch, asking me to give him full particulars with reference to the details of this system as carried out in the city of Memphis."

In commenting upon quarantine as at present practised in this country, the president said that he considered it a wrong principle that commerce should be taxed for the support of quarantine establishments. In his judgment, the people who are protected should pay the cost of such protection. He was not so much concerned with the unjust tax laid upon ship-owners as with the gross injustice to passengers practised at many ports in various parts of the world where they are so unfortunate as to be detained at a quarantine station. He narrates the history of a case of this kind which fell under his own observation. He says, "When I left Brazil, in the month of August last, small-pox was epidemic both in Rio de Janeiro and at Para. Our ship touched at Para, and five days later at Barbadoes. A passenger for this port was not allowed to land, because of the prevalence of small-pox in Brazil. Proceeding to St. Thomas, less than two days' sail from Barbadoes, our passenger was again refused permission to land, except to go to the quarantine station for a certain number of days. This was all right, but the conditions upon which he would be received seemed

to me to be all wrong. Either he himself or the ship must guarantee the payment of the quarantine fees, which would be three dollars a day for his board, and five dollars a day to the quarantine physician, if he were alone. If others were at the station at the same time, this fee would be divided between them. One can easily imagine what a hardship such a tax would be for a person of limited means, who had only provided himself with funds for the journey he had undertaken. The agent of the ship refused to take any responsibility, and our passenger had no resource but to submit to the imposition, or to come on to New York, paying his passage to that port."

Another illustration of the evils arising from the present system of supporting quarantine establishments was given by Dr. Sternberg, in his address, as being his own experience when he recently arrived at New York quarantine on his return from Brazil. "With the deputy health-officer, who boarded our ship, came a man with a jug. I was informed by one of the officers of the ship that he was to disinfect the vessel. Being somewhat curious to know the method of disinfection employed, I asked the ship's surgeon to go with me to inspect, when, after a detention of less than one hour, we had started from the quarantine station for our wharf. We found that the man with the jug had lowered a bucket by means of a rope through one of the hatches between decks. Upon pulling up this bucket, I found that it contained two or three pounds of some powder which had been wet, probably with acid solution, and which gave off an odor of chlorine. No doubt, when first lowered between decks, there had been a considerable evolution of chlorine; but, in the vast space to be disinfected, it was so diluted that at the end of an hour I did not detect the odor of chlorine-gas when I lifted the hatch, and it was only by approaching my nose to the bucket that I was able to ascertain what disinfectant had been used. The most curious part of the story is, that I was informed that the bucket had been lowered between decks to disinfect a quantity of hides which were stored in the hold. What was the object of this 'disinfection'? Evidently not to disinfect, for no one at the present day would think of maintaining that the hides in the hold had been disinfected by the procedure of the man with the jug. The only object that I can conceive of depends upon the fact that there is a fee for disinfecting, which must be paid by the agents of the ship; at least, I was so informed by one of the officers of the ship."

The president referred to the fact that while exotic pestilential diseases, such as yellow-fever and cholera, were the levers which move corporations to make necessary sanitary improvements, these are, as compared with certain indigenous or naturalized infectious diseases, of secondary importance. The chief aim of the American Public Health Association should be to ascertain what measures are most effectual for the restoration of their endemic maladies, such as typhoid-fever and the malarial fevers, and for the banishment of all diseases in which the contagion is given off from the persons of the sick, such as scarlet-fever and small-pox. So far as the diseases of the class last mentioned are concerned, we may safely say that we know how they may be banished from a community; viz., by isolation of the sick, and disinfection of all infectious material, and, in the case of small-pox, by vaccination. The main mission of the sanitarian, therefore, is to insist upon the thorough execution of these measures.

Other topics dealt with in the address were the necessity for instruction of the people in the principles of personal hygiene, in which labor Mr. Henry Lomb of Rochester had borne so noble and generous a part, by giving prizes for essays on the construction of the homes and the composition of the food of the working-man; the erection of laboratories, such as that at Johns Hopkins University, the Hoagland at Brooklyn, and others at New York, Philadelphia, Boston, and Ann Arbor; the infectious diseases of animals, — anthrax, swine-plague, hydrophobia, etc. With reference to the germ of cholera, Dr. Sternberg said, —

"With reference to cholera, I may say to you that recent researches give support to the conclusions of Koch as to the pathogenic rôle in this disease, of the spirillum discovered by him in the intestines of cholera patients. Its constant presence in this disease seems to be demonstrated, and it is now generally admitted by bacteriologists that there are definite characters by which it may be distinguished from similar organisms obtained from other

sources, such as the Finkler-Prior spirillum and the cheese spirillum of Deneke, which closely resemble it.

"Lustig, director of the cholera hospitals at Trieste, examined the dejecta in one hundred and seventy cases of cholera, and found the spirillum of Koch in every case: on the other hand, the bacillus of Emerich was only found in forty out of the whole number of cases examined. Tizzoni and Cattani also found Koch's spirillum in the contents of the intestine in twenty-four cases examined by them during the epidemic at Bologna in 1886. At Padua, also, researches made by Canestrini and Morpurgo gave the same result: the spirillum was constantly found in the dejecta in recent cases. These observers state that the cholera spirillum retains its motility and reproductive power for a considerable time in sterilized distilled water. They were able to obtain cultures after two months from such water. This important fact has been verified by Pfeiffer, who found, however, that in the presence of common saprophytic bacteria the cholera microbe soon died out. Hueppe has shown that the cholera spirillum forms reproductive elements, which he calls arthrospores. These are not so readily destroyed by desiccation as are the fresh bacilli, but they have nothing like the resisting power to heat and chemical agents which characterizes the endogenous spores of the bacilli. The exact proportion in which various disinfecting agents are destructive of the vitality of the cholera spirilla has now been determined with great precision, and will be stated in detail in the report of the committee on disinfectants for the present year. This committee has also made extended experiments of the same kind, in which the typhoid bacillus and various other pathogenic organisms have served as the test of germicide power. The chemical products developed in cultures as a result of the vital activity of the cholera spirillum have been studied by Bitter, Buchner, and Contani. The last-named author claims to have demonstrated the presence of a poisonous ptomaine in cholera cultures, which, when injected into the peritoneal cavity of dogs, gives rise to symptoms resembling those of cholera. A recent observation of value is that of Bujwid, who finds that bouillon cultures of the cholera spirillum have a peculiar chemical re-action by which they may be distinguished. According to this author, the addition of a 5-10-per-cent solution of hydrochloric acid to such a culture gives rise, within a few minutes, to a rose-violet color, which subsequently, when exposed to light, changes to a brownish shade. The re-action does not occur in impure cultures. The Finkler-Prior spirillum is said to give a similar re-action after a longer time, but the color first developed is of a more brownish hue."

The etiological rôle and biological character of the typhoid bacillus, discovered by Eberth in 1880, were fully discussed. Dr. Sternberg says that there is very little doubt that this organism is the cause of typhoid fever, although no satisfactory proof by inoculation in lower animals has as yet been found. This, however, he does not regard as surprising, inasmuch as we have no evidence that any of the animals experimented upon are liable to contract the disease, as man does, by drinking contaminated water. In speaking of malaria and its causative micro-organism, he said, —

"Among the most important investigations of the past year are those of Councilman of Baltimore, and Osler of Philadelphia, with reference to the presence of micro-organisms in the blood of malarial-fever patients. Both of these observers confirm the discovery of Laveran, who in 1880 announced, as the result of extended researches made in Algeria, that blood drawn from the finger of such patients during a febrile paroxysm contains a parasitic infusorium, which presents itself in different phases of development, and which in a certain proportion of the cases was observed as an actively motile flagellate organism. Osler and Councilman have found all of the forms described by Laveran; and the last-named observer reports that in recent researches in which blood was obtained directly from the spleen, the flagellate form was almost constantly found. Whether the amoeboid 'plasmodium' found by Marchiafava and Celli, of Rome, represents an early stage in the development of this organism, or whether it simply represents a change in the red-blood corpuscles, which occurs also in other diseases, as is claimed by Mosso, has not yet been definitely determined. It is somewhat curious that just when we are receiving satisfactory evidence of the parasite of Laveran in the blood of malarial-fever patients, the

bacillus of Klebs and Tomassi-Crudelli, which appeared to be dead and buried, has again been introduced to our notice by the distinguished German botanist Ferdinand Cohn. In his paper, published in June last, he gives an account of the researches of a young physician named Schiavuzzi, who has made researches in the vicinity of Pola, a malarial region in Istria. The method followed was that of Klebs and Tomassi-Crudelli; viz., examination of the air and water in malarial localities, and inoculation experiments in rabbits.

"The bacillus was constantly found in the air, and the rabbits inoculated presented symptoms and pathological lesions believed to be identical with those of malarial-fever in man. I cannot at the present time go into a critical discussion of the evidence presented, but would refer you to an experimental research made by myself in New Orleans in the summer of 1880, in which I repeated the experiments of Klebs and Tomassi-Crudelli, and arrived at the following general conclusions:—

"Among the organisms found upon the surface of swamp mud, near New Orleans, in the gutters within the city limits, are some which closely resemble, and perhaps are identical with, the bacillus malariae of Klebs and Tomassi-Crudelli; but there is no satisfactory evidence that these, or any of the other bacterial organisms found in such situations, when injected beneath the skin of a rabbit, give rise to a malarial-fever corresponding with the ordinary paludal fevers to which man is subject.

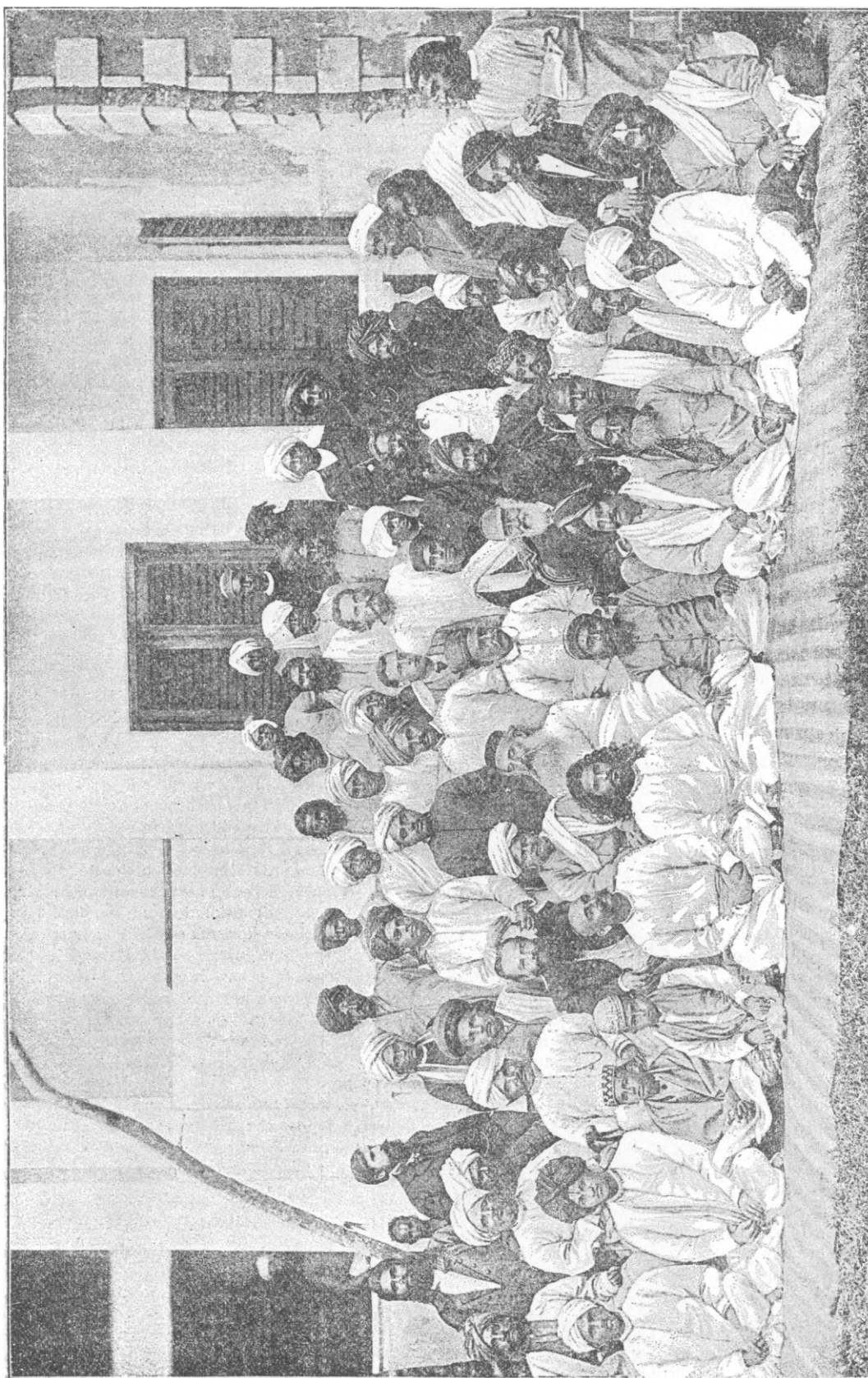
"I see no reason to modify the opinion here expressed, notwithstanding the indorsement given by Cohn to the results announced by Schiavuzzi. These researches relating to organisms in the air and water, and experiments on rabbits, especially in the hands of an inexperienced investigator, cannot have any great scientific value in the elucidation of an etiological problem. The sources of possible error are too numerous, and the method is in any case inadequate for the complete solution of the problem. It is essential that the infectious agent, especially one so easily demonstrated as this bacillus, be proved to be present in the blood or tissues of malarial-fever patients; and in the absence of such proof, experiments on rabbits, and researches in the air of malarial regions, can have but little weight. It may well be that in the swampy districts of warm climates, where malarial-fevers prevail, one or more species of bacillus will be found in the air or in the water, which are absent from the drier air and running waters of non-malarious uplands; but this is simply an interesting fact in natural history, relating to the distribution of organisms of this class, and by itself cannot be accorded any value in a consideration of the important question of etiology. The method of research pursued by Laveran, by Marchiafava and Celli, by Councilman and by Osler, is the true one, and none of these gentlemen have encountered the bacillus of Klebs and Tomassi-Crudelli in their extended researches. On the other hand, they are in accord as to the presence in the blood of a flagellate organism, and of certain spherical and crescentic bodies, which are believed to represent different stages in the life-history of this infusorium."

The address, taken as a whole, is one of the best which has ever been delivered before the association, and will doubtless excite great interest among sanitarians. We shall take occasion to refer hereafter to some of the recommendations made by Dr. Sternberg.

THE THEOSOPHICAL MOVEMENT IN INDIA.

ERNST VON WEBER prints in *Ueber Land und Meer* an interesting paper on the theosophists of India, and accompanies it with the illustration which is reproduced on p. 262. He calls attention to the fact that students of *Völkerpsychologie* cannot fail to be impressed by India's awakening from her long intellectual sleep. To-day the new and fresh intellectual life may be observed from the Himalayas to Ceylon, and from the Indus to the fruitful lands of Burmah. This movement owes as much to the spread of the English language as to any other one cause. It is now customary for all educated Hindus to be able to speak the English language fluently, and the British Government has helped this on by its system of schools.

The Aryan Hindu is naturally of a metaphysical and speculative turn of mind, and it is therefore not to be wondered at that the



Mr. Cooper.

E. v. Weber.

Subbia Rad. Colonel Olcott.
Bavanishangar.Mr. Leadbeter.
General Morgan.

Prince Harisinghjee.

ANNUAL CONGRESS OF THE THEOSOPHICAL BROTHERS AT ADYAR.

newly aroused intellectual activity should have found expression in the so-called theosophical movement. The first impulse to this idealistic development did not come, however, from India itself, but from abroad. It came from the land which, as the writer cynically expresses it, is the most unfruitful soil for idealistic fruit, the United States of America. It was in New York, as long ago as 1875, that Colonel Olcott laid the corner-stone of the theosophical structure which was soon to exercise so wide-spread an influence. The principles of the cosmopolitan brotherhood of theosophists, which in certain particulars resemble those of the Freemasons or those of the Jewish sect of the Essenes, rapidly spread through other countries. The indefatigable apostle of the new society did his work so well, that the number of associate societies, which in 1879 was only two, increased in 1883 to ninety-three, and in 1886 to one hundred and thirty-two. Of this last number, 107 are in India, 8 in Europe, 15 in America, 1 in Africa, and 1 in Australia. The headquarters and administrative centre of all these societies is Adyar, a rural capital in Madras, where Colonel Olcott dwells, on the banks of a river in a paradise of palms and flowers. His villa also serves as the gathering-place where each year in Christmas week more or fewer of the delegates of the theosophical societies throughout India assemble in convention. Colonel Olcott has managed to imbue thousands of men of the higher circles of India with his ideas. He is greatly honored by his fellow-theosophists, and is loved as a father and benefactor. His occasional journeys through the country are like triumphal processions, and his influence over the cultured classes of the Hindus throughout India is extraordinary.

Some idea of the objects and aims of the Theosophical Society may be gathered from the following selection from the declaration of principles adopted at the annual assembly of the delegates in 1886. The objects of the society are there set forth as, (1) to lay the foundation for a universal brotherhood of man, without distinction of race, religion, or color; (2) to promote the study of the Aryan and other Oriental literatures, religions, and sciences; (3) to investigate hitherto unknown natural forces and the psychical powers of man (which is pursued by a part of the brotherhood only). The brotherhood invites to membership all those who love their fellow-men, and who believe the divisions following from differences of race, religion, and color, to be an evil; all students and scholars; all earnest seekers after truth; all philosophers in the East as well as in the West; all those who love India and desire the return of its former spiritual greatness; and, finally, all those who are striving after permanent good, and not mere passing pleasures and the interests of a wordly life, and who are ready to make personal sacrifices in order to attain to knowledge of the highest good. The society professes no special religion, and has in no wise the character of a sect, for it includes followers of all religions. It demands of all its members only such tolerance of other faiths as each man asks for his own. The society interferes in no way with the Indian laws of caste, nor with any other social customs and usages.

To exemplify these tolerant principles, the assembly hall at Adyar contains life-size portraits of the representatives and founders of all the great religions. One of the matters in which the society is busily engaged is the collecting of rare books of the old Indian literature, written often on palm-leaves. The value of this Sanscrit library increases daily, and it is hoped to make it in time the most complete in the world.

The illustration on p. 262 shows the delegates who assembled at Adyar in 1885. The beautiful Indian costumes, with their bright colors, and the high turbans often sewn with gold and silver threads, made the group peculiarly artistic and pleasing. Among the distinguished theosophists shown are President Olcott, Prince Harisinghshee, the English general Morgan, the theosophist evangelist Leadbeater (formerly an Anglican clergyman), the Sanscrit scholar Bavanishangar, Mr. Cooper Oakley, an American and the editor of the *Theosophist*, and the Hindu philosopher Subba Rad. At these assemblies it is noticed by visitors that the delegates confine themselves to a vegetarian diet, and do not partake of any liquor whatsoever. The assembly closed with a brilliant garden-party, at which old Sanscrit songs were sung to Indian music, and the delegates were sprinkled with rose-water and bedecked with flowers.

BOOK-REVIEWS.

The Education of Man. By FRIEDRICH FROEBEL. Tr. by W. N. HAILMANN. New York, Appleton. 12°.

Elementary Psychology and Education. By J. BALDWIN. New York, Appleton. 12°.

DR. HARRIS is issuing the volumes of his International Education Series with great promptness. Volume V. in the series is Froebel's classic work translated. Since this was written, now more than sixty years ago, its readers have increased in number year by year. Inaccessibility and bad translations have hindered its progress in this country, but both these obstacles are now overcome, and no teacher who is imbued with the spirit of his profession will fail to have the 'Education of Man' by him for careful study and constant reference. We believe that posterity will award to Froebel the highest place among modern educators. He was infinitely more practical than the authors of 'Emile' and 'Levana,' and infinitely more profound and philosophical than Pestalozzi. The spirit of the kindergarten is Froebel's greatest achievement: the kindergarten itself is a mere detail. The spirit runs through all sound education, and the great manual-training movement, now the distinguishing feature of our educational development, is but another manifestation of it. The present translation of Froebel is a very good one, and leaves little to be desired. We regret that the translator has disfigured the text and broken the continuity by interjecting observations of his own.

Volume VI. is Baldwin's 'Elementary Psychology and Education.' Of it we cannot conscientiously say any thing complimentary, and we confess our surprise at its finding a place in the series. We do not object to making psychology as elementary as one pleases, but we do object to making it pre-Kantian. The present author may have heard of the *Kritik der reinen Vernunft*, but he certainly has never read it. We agree most heartily with Dr. Harris, that a teacher should know something of psychology, and we would go considerably further than he does in emphasizing the fact. But we submit that to teach psychology that is positively wrong and unscientific under the pretence that it is elementary, is worse than to teach nothing of it at all. Illustrations of loose statement and positive error abound in this book. We read, for example, of "sense-perception, conscious perception, and noumenal perception." The 'enduring self,' matter, mind, space, causation, right, beauty, and the like, are included under 'noumena.' We are told also that "choice is uncaused cause," and the fact that "literature represents man as free and responsible" is cited as an argument for freedom of the will. It is not profitable to multiply the evidences of the author's incapacity to write the book. It is in no respect worthy of a place in this series.

NOTES AND NEWS.

ANOTHER important acquisition to our store of knowledge has recently been made, says *Nature*. Glucose, commonly called grape-sugar, has been artificially prepared by Drs. Emil Fischer and Julius Tafel in the chemical laboratory of the University of Würzburg. This happy achievement, which is announced in the number of the *Berichte* just received, is one which has long been looked forward to, and which cannot fail to give deep satisfaction in chemical circles all over the world. As is generally the case in syntheses of this description, not only has the sugar itself been actually prepared, but, what is at least quite as important, considerable light has been thrown upon that much-discussed question, the constitution of sugars. A most remarkable, and yet only to be expected, attribute of this artificial sugar is that it is found to be entirely incapable of rotating a beam of polarized light. As is well known, there are several naturally occurring varieties of glucose, all of which may be expressed by the same empirical constitution, and all possessing the power of rotating the plane of polarization: dextrose, or grape-sugar, the best-known of these varieties, as its name implies, deviates the plane of polarization to the right, as do several other less important varieties; while lævulose, or fruit-sugar, rotates the plane to the left. But in artificially preparing a glucose there is just as much tendency for one kind to be formed as another, and the probability is that both dextro and lævo are simultaneously formed, and thus neutralize each other, producing a totally inactive mixture. It may be that, as in the case of racemic acid,

the two kinds are formed side by side, and neutralize each other in the solution; or it may even be, that, as is the case with truly inactive tartaric acid, there is a true neutralization within the molecule itself. Which of these hypotheses is correct is a question for further work to decide.

— Gaillard's 'French for Young Folks' (New York, Werner) is constructed on a sound pedagogic plan, has numerous and good illustrations, and is nicely gotten up. It devotes special attention to the subject of French pronunciation, and gives some very practical directions on the subject. We only question whether the introductory chapters do not employ too many long words to be easily comprehended by the beginner.

— The Fish Commission steamer 'Albatross' left Washington last week on her extended cruise to the Pacific coast. The voyage was arranged by the late Professor Baird, and is now being carried out by his successor, Mr. G. Brown Goode, the new commissioner. The 'Albatross' has been engaged for several years in the deep-sea work of the Fish Commission in the Atlantic, the results obtained being of great economic and scientific value. There has come a demand from the Pacific coast for similar work there, where the fisheries have not been developed to any extent, little being known of the number or character of the food-fishes of that coast. To hunt out the food-fishes, locate their habitats, and to develop the resources of the great Pacific, is the task before the 'Albatross,' which is thoroughly equipped for the scientific work. The scientific party aboard will consist of Prof. Leslie A. Lee of Bowdoin, who goes as chief naturalist; Mr. Thomas Lee, who has been engaged on the deep-sea work of the commission for a long time; and Mr. C. H. Townsend, who has just returned from an expedition to Central America. The 'Albatross' is officered and manned by the navy, and is under the command of Lieut.-Com. Zera L. Tanner. The 'Albatross' will reach California next May. Stops will be made *en route*, which will delay the voyage somewhat, the time being occupied by the scientists in making shore-collections. The ship goes out without any definite period fixed as to its return, but it is not probable the vessel will be seen in the Atlantic again for three or four years. It is deemed important to carry on investigations not only in the latitude of California, but off the Alaska coast. The ship will touch frequently at ports on the Pacific coast, and be in constant communication with the Fish Commission. It is probable, too, that from time to time other scientists will join her for the purpose of doing special work. The scientific outfit of the vessel is declared by those who have examined it to be the best that was ever put aboard a vessel.

— Dr. Cohn, oculist at Breslau, has invented a new apparatus for testing the eyesight of children. This is a matter which is scarcely attended to at all in this country. Periodical tests have shown that there is much more small mischief in the eyes of young students than is generally supposed, which can easily be stopped if the necessary precautions are taken in time. Dr. Cohn's invention consists of a white board twenty-five centimetres square, to which are fastened six rows of hooks, shaped thus \square , one centimetre square. He who possesses a normal eyesight will be able to tell, at a distance of six metres in ordinary daylight, in which direction — upwards, downwards, to the right, or to the left — the hooks, which are painted of different colors, are turned. Pupils who cannot do this injure their eyes by constantly looking at the blackboard. The same board may be used to determine whether the ordinary daylight is sufficient for the rooms. As soon as the teacher cannot distinguish the direction of the hooks at a distance of six metres without straining his eyes, the gas ought to be lighted at once.

— In the December number of *Harper's* is an article by Mr. George F. Kunz, the gem expert of Messrs. Tiffany & Co., on the precious stones of America. Mr. Kunz makes it clear that the alleged recent discoveries of diamonds in Kentucky amounts to nothing; but sapphires, spinels, crystals of topaz, beryls, garnets the finest in the world, tourmalines, amethysts, and turquoises are obtained in several localities in considerable profusion. The striking feature of the article is the lithographed page of these gems, containing a diamond, Manchester, Va.; sapphire, Helena, Montana; sapphire, Franklin, N.C.; topaz, Crystal Peak, Col.; emerald, Stony Point, N.C.; aquamarine, Stoneham, Me.; beryl (golden-colored),

Litchfield, Conn.; garnets (cut and natural), Gallup, N.M.; peridot, Gallup, N.M.; tourmaline, Mount Mica, Paris, Me.; tourmaline (green with red centre), Paris, Me.; lithia emerald (hiddenite), Stony Point, N.C.; amethyst, Stow, Me.; cairngorm stone, Pike's Peak, Col.; turquoise, Nevada; arrow-points of obsidian, carnelian, and agatized wood, Oregon; pearl, Paterson, N.J. To produce this plate, fully twenty impressions were required, and we believe this was the first colored plate ever published in *Harper's*.

— At a special meeting of the Board of Regents of the Smithsonian Institution held Nov. 18, Prof. S. P. Langley was elected secretary of the institution, to succeed the late Prof. S. F. Baird.

LETTERS TO THE EDITOR.

*** The attention of scientific men is called to the advantages of the correspondence columns of SCIENCE for placing promptly on record brief preliminary notices of their investigations. Twenty copies of the number containing his communication will be furnished free to any correspondent on request.*

The editor will be glad to publish any queries consonant with the character of the journal.

Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.

Cheyenne.

In the note published in your issue of Nov. 11, I made an unaccountable mistake, and wish to correct it. The Cheyennes are the 'cut-arms,' and in the sign-language are designated by drawing the hand, in imitation of a knife, across the biceps of the arm. It is the Pawnees whose sign is wolf-ears made with thumb and forefinger.

Your types say *loo-yah* erroneously for *loo-hah*.

The French trappers told me a legend of the Sioux to the effect that once in holding a council they were disturbed by the noisy play of the children, and moved over to another creek to hold the council in quiet. In attempting to overtake their parents, the children took the back track on which the village had lately come in. They kept going, and the boys and girls grew up and intermarried, and became another tribe, the Cheyennes. The Sioux call themselves *Lah-ko-ta* (the *t* strongly dental), not *Dakota*, meaning 'cut-throats,' the sign being the open hand drawn edgewise across the throat.

GEO. WILSON.

Lexington, Mo., Nov. 15.

The 'Act of God' and the Railway-Company.

RETURNING from New York Nov. 12, the train was crowded with passengers. At the forward end of the car was a large stove full of red-hot coals. This stove had no guard, nor hardly any thing to prevent it from upsetting. A slight collision would have emptied the contents of the stove, and probably several people would have been burned to death. Would Mr. Appleton Morgan consider such an affair an 'Act of God'?

ASAPH HALL.

Washington, Nov. 19.

Changes in Indian Languages.

I OBSERVE a blunder I made in attributing the word *quisquis* ('a hog') to Schoolcraft instead of Zeisberger, in my communication on changes in Indian languages, in *Science* of Nov. 18. The Onondagas now pronounce it *kweaskweas*, almost in four syllables, and with a resemblance to a hog's melodious note. I may add that the Onondagas divide 'Hiawatha,' a name of their own, differently from many white people. It is pronounced by them 'Hi-a-wat-ha,' 'Onondaga' they sound like the whites in talking with them, but retain the old broad sound among themselves.

W. M. BEAUCHAMP.

Baldwinsville, N.Y., Nov. 19.

Natural History Notes on Alaska.

IN my 'Natural History Notes on Alaska,' forming Part III. of the 'Report of the Cruise of the Steamer "Corwin" in the Arctic Ocean in 1885,' which has recently been published as Ex. Doc. 153, Forty-ninth Congress, second session, I notice two plates of fishes, and one plate representing a plant. I desire to say that I never saw these plates before they appeared in this sketch, nor can I explain how they came to be inserted in it. I disclaim all responsibility for the plates, and I do not indorse them. They are inaccurate, and absurd pictures of what they purport to represent.

CHAS. H. TOWNSEND.

Washington, Nov. 20.